

Applicant:

For:

Prendergast et al.

ISOLATION SYSTEM WITH ANALOG COMMUNICATION ACROSS AN ISOLATION BARRIER

1. An isolation system with analog communication across an isolation barrier

2 comprising:

3 an isolation barrier circuit having at least one isolation element;

4 a digital to analog circuit having an analog output connected to the

5 isolation barrier and an input for receiving an input digital signal to be communicated

6 across the isolation barrier; and

7 an analog to digital circuit having an input coupled to the analog

8 output of the isolation barrier circuit for providing a digital output signal.

1 2. The isolation system of claim 1 in which said digital to analog circuit

2 includes an encoder circuit responsive to said input digital signal to provide a digital signal,

3 and a digital to analog converter responsive to said digital signal to provide to said isolation

4 barrier said analog output signal.

1 3. The isolation system of claim 1 in which said digital to analog circuit

2 includes a digital to analog converter with an input for receiving said input digital signal

3 and a modulation circuit responsive to said digital to analog converter for providing said

4 analog output.

1 4. The isolation system of claim 1 in which said analog to digital circuit

2 includes an analog to digital converter responsive to said input analog signal from said

3 isolation barrier to provide a digital signal, and a decoder circuit responsive to said digital
4 signal to provide said digital output response.

1 5. The isolation system of claim 1 in which said analog to digital circuit
2 includes a demodulator circuit responsive to said input analog signal from said isolation
3 barrier, and an analog to digital converter responsive to said analog signal to provide said
4 digital output signal.

1 6. The isolation system of claim 1 in which said analog to digital circuit
2 includes an analog to digital converter.

1 7. The isolation system of claim 1 in which said digital to analog circuit
2 includes a digital to analog converter.

1 8. The isolation system of claim 1 in which said digital to analog circuit
2 includes a termination resistance connected with said isolation barrier.

1 9. The isolation system of claim 1 in which said analog to digital circuit
2 includes a termination resistance connected with said isolation barrier.

1 10. The isolation system of claim 1 in which said isolation element includes a
2 capacitance.

1 11. The isolation system of claim 1 in which said isolation element includes a
2 transformer.

1 12. The isolation system of claim 1 in which said analog to digital circuit
2 includes a common mode interference signal sensing circuit and a summing circuit for
3 removing the common mode interference signal from the received analog signal from the
4 isolation barrier.

1 13. The isolation system of claim 1 in which said digital signal to be
2 communicated across said isolation barrier includes data.

1 14. The isolation system of claim 1 in which said digital signal to be
2 communicated across said isolation barrier includes control information.

1 15. The isolation system of claim 14 in which said digital signal to be
2 communicated across said isolation barrier includes reference and calibration information.

1 16. The isolation system of claim 1 in which said digital signal to be
2 communicated across said isolation barrier includes data and control information.

1 17. The isolation system of claim 2 in which the signal is a constant average
2 signal.

1 18. The isolation system of claim 3 in which the signal is a constant average
2 signal.

1 19. The isolation system of claim 4 in which the signal is a constant average
2 signal.

1 20. The isolation system of claim 5 in which the signal is a constant average
2 signal.

1 21. A bi-directional isolation system with analog communication across an
2 isolation barrier comprising:
3 an isolation barrier circuit having at least one isolation element;
4 a first digital to analog circuit having an analog output coupled to a
5 first side of the isolation barrier and an input for receiving an input digital signal to be
6 communicated across the isolation barrier;
7 a first analog to digital circuit having an input coupled to the first
8 side of the isolation barrier circuit;
9 a second digital to analog circuit having an analog output coupled to
10 a second side of the isolation barrier and an input for receiving an input digital signal to be
11 communicated across the isolation barrier; and
12 a second analog to digital circuit having an input coupled to the
13 second side of the isolation barrier circuit.

1 22. The bi-directional isolation system of claim 21 in which the input digital
2 signals are communicated simultaneously across the isolation barrier circuit.

1 23. The bi-directional isolation system of claim 21 in which the input digital
2 signals are communicated alternately across the isolation barrier circuit.

1 24. The bi-directional isolation system of claim 21 further including at least one
2 echo cancellation circuit for removing a local echo signal from the input of at least one of

3 said first and second analog to digital circuits.